

Application No. 09/558,053

Reply to the Notice of Allowance of October 9, 2003

IN THE CLAIMS

1-28. (Canceled)

29. (Previously Presented) A process of fabricating a semiconductor device comprising the steps of:

forming a first insulating film on a semiconductor substrate;

forming a second insulating film on said first insulating film, said second insulating film being made of a material different from that of the first insulating film and having a thickness smaller than that of the first insulating film;

forming a third insulating film on said second insulating film, said third insulating film being made of a material different from that of the second insulating film having a thickness larger than that of the second insulating film;

forming a groove in a region of said third insulating film, in which a wiring is to be formed, said groove having a bottom to which said second insulating film is exposed;

removing a part of that portion of the second insulating film which is exposed to the groove, and a part of the first insulating film under the portion of the second insulating film, using the same etching mask covering said third insulating film and another part of said portion of the second insulating film which is exposed to the groove, and thus forming a contact hole reaching to the semiconductor substrate; and

burying the groove and the contact hole with copper to form a copper wiring in said groove and a copper contact in said contact hole, and controlling said burying with said copper to avoid formation of a native oxide.

30. (Previously Presented) The process according to claim 29, wherein said first insulating film is substantially formed of SiO_2 , said second insulating film is substantially formed of Si_3N_4 , and said third insulating film is substantially formed of SiO_2 .

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31. (Previously Presented) The process according to claim 30, wherein said metal wiring is formed of Al.

32. (Previously Presented) The process according to claim 29, further comprising the step of forming a barrier metal film on inner surfaces of said groove and said contact hole.

33. (Previously Presented) The process according to claim 32, wherein said barrier metal film is formed of Nb.

34. (Canceled).

35. (Previously Presented) The process according to claim 29, further comprising the step of forming a carbon film on said third insulating film.

36. (Previously Presented) The process according to claim 29, further comprising the step of forming a barrier film on inner surfaces of said groove.

37. (Previously Presented) The process according to claim 36, wherein said barrier metal film is formed of Nb.

38. (Previously Presented) The process according to claim 35, further comprising the step of forming another barrier metal film on said metal wiring.

39. (Previously Presented) The process according to claim 38, wherein said another barrier metal film is formed of Nb.

40. (Previously Presented) A process of fabricating a semiconductor device comprising the steps of:

forming a first insulating film on a semiconductor substrate;

forming a second insulating film on said first insulating film, said second insulating film being made of a material different from that of the first insulating film and having a thickness smaller than that of the first insulating film;

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forming a third insulating film on said second insulating film, said third insulating film being made of a material different from that of the second insulating film and having a thickness larger than that of the second insulating film;

forming a groove in said third insulating film having a bottom comprising said second insulating film; and

forming copper in said groove, wherein forming said copper is controlled to avoid formation of a native oxide;

wherein said step of forming said groove comprises, using the same mask:

etching through said second insulating film to expose said first insulating film while leaving a remaining second portion of said second insulating film; and

removing a third portion of said first insulating film to expose said substrate while leaving a remaining fourth portion of said first insulating film, and

wherein said mask is formed on said third insulating film and said second portion of said second insulating film.

41. (Canceled)